

AMENDMENTS TO THE CLAIMS

1. (Canceled)
2. (Canceled)
3. (Canceled)
4. (Canceled)
5. (Canceled).
6. (Canceled).
7. (Canceled).
8. (Canceled).
9. (Canceled).
10. (Canceled).
11. (Canceled).
12. (Canceled)
13. (Canceled).
14. (Currently Amended) In a system wherein at least two sources of electric power are connected in parallel, each source of electric power having associated with it a regulator, each regulator for producing a regulating signal for its associated source of electric power, one of the regulators ~~being a~~ operating as a master regulator and at least one of the regulators ~~being a~~ operating as a follower regulator, a method for controlling the sources of electric power comprising:
sensing an output with the master regulator of a source of electric power;

~~generating a control~~ regulating signal for regulating the source of electric power associated with the master regulator based on the sensed output;

~~generating a regulating signal with the master regulator based on the control signal, the regulating signal for regulating the source of electric power associated with the master regulator;~~

determining a percentage of maximum output for the source of electric power associated with the master regulator;

sending a instruction representing the percentage of maximum output from the master regulator to the follower regulator;

sensing at least one operational characteristic for each source of electric power associated with the follower regulator; and

~~generating~~ determining a regulating signal with the follower regulator ~~based on the signal for producing the percentage of the maximum output for the source of electric power associated with the follower regulator based on the instruction from the master regulator, the regulating signal for producing the percentage of the maximum output for the source of electric power associated with the follower regulator and the operational characteristic.~~

15. (Canceled)

16. (Canceled)

17. (Currently Amended) A power system for producing electrical power comprising:
at least two sources of electric power connected in parallel, the sources of electric power individually responsive to an associated regulating signal;

at least two voltage regulators comprising:

a master voltage regulator ~~for producing a control signal in response to variations in voltage at an output of the source of electric power, associated with the master regulator, for producing a regulating signal to the associated source of electric power, and for sending a follower regulator control signal to at least one follower regulator based on the control signal and based on at least one operating characteristic of the source of electric power associated with the master regulator; and~~

at least one follower regulator for receiving the ~~follower regulator control signal, for~~ sensing at least one operational characteristic of its associated source of electric power, and for

~~determining whether to accept or reject the control signal based on the operational characteristic and for producing a regulating signal for its associated source of electric power based on the follower regulator signal and based on one operating characteristic of the source of electric power associated with the follower regulator.~~

18. (Currently Amended) The power system of claim 17, wherein the sources of electric power comprise alternators producing power from at least one source of motive power; further comprising an energy storage device; and wherein the alternators are connected in parallel across the energy storage device.

19. (Currently Amended) The power system of claim 17, wherein the energy storage device comprises a battery.

20. (Canceled)

21. (Canceled)

22. (Canceled)

23. (Original) In a system wherein at least two sources of electric power are connected in parallel, each source of electric power having associated with it a regulator, each regulator for producing a regulating signal for its associated source of electric power, a method for controlling the sources of electric power comprising

determining which regulator is a master regulator after power-up of the system;
sensing an output of at least one of the sources of power;
generating, by the master regulator, a control signal to control its associated source of electric power;
sending a signal to a follower regulator based on the control signal;
generating, by the follower regulator, a regulating signal for a source of electric power associated with the follower regulator based on the at least one signal.

24. (Original) The method of claim 23, wherein determining which regulator is a master regulator after power-up of the regulators comprises sending a communication from one regulator to another regulator to determine which regulator is a master regulator.

25. (Original) The method of claim 24, wherein sending a communication comprises arbitrating between the regulators to determine which regulator is the master regulator.

26. (Original) The method of claim 24, wherein sending a communication from one regulator to another regulator to determine which regulator is a master regulator comprises sending by the one regulator to all remaining regulators a message declaring the one regulator as the master regulator.

27. (Original) The method of claim 24, wherein determining which regulator is a master regulator comprises determining which regulator first sends a communication declaring itself the master regulator.

28. (Original) The method of claim 23, wherein the sources of electric power comprise alternators producing power from at least one source of motive power; and wherein determining which regulator is a master regulator is based on location of the alternator associated with the regulator.

29. (Original) The method of claim 23, wherein determining which regulator is a master regulator is based on voltages measured by the regulators.

30. (Original) The method of claim 29, wherein a highest voltage measured by a regulator is determined to be the master regulator.

31. (Original) The method of claim 29, wherein determining which regulator is a master regulator is further based on a random number generator.

32. (Original) The method of claim 23, wherein determining which regulator is a master regulator comprises statistically analyzing voltages measured by the regulators.

33. (Original) The method of claim 23, further comprising determining, for a second time, which regulator is the master regulator.

34. (Original) The method of claim 33, wherein determining, for a second time, which regulator is the master regulator is performed a predetermined amount of time after the step of determining which regulator is a master regulator after power-up or is performed if a predetermined set of conditions are met.

35. (Original) The method of claim 24, further comprising accessing software to determine whether the one regulator is the master regulator.

36. (Original) A voltage regulator having functionality as a master regulator and as a follower regulator comprising:

a processor;
a communication interface in communication with the processor;
memory in communication with the processor; and
programming code stored in the memory for determining whether the voltage regulator operates as a master regulator or as a follower regulator.

37. (Original) The voltage regulator of claim 36, wherein the programming code comprises instructions for sending a communication via the communication interface to a second regulator regarding determining which regulator is the master regulator.

38. (Original) The voltage regulator of claim 36, wherein the programming code comprises instructions for arbitrating between the regulator and a second regulator to determine which regulator is the master regulator.

39. (Original) The voltage regulator of claim 38, wherein the programming code comprises instructions for a random number generator.

40. (Original) The voltage regulator of claim 36, further comprising a switch, and wherein the programming code comprises instructions for accessing the switch to determine whether the voltage regulator operates as a master regulator or as a follower regulator.

41. (Original) The voltage regulator of claim 36, wherein the programming code comprises a constant value for determining whether the voltage regulator operates as a master regulator or as a follower regulator.

42. (Original) The voltage regulator of claim 36, further comprising:
programming code comprising instructions for functioning as a master regulator; and
programming code comprising instructions for functioning as a follower regulator.

43. (Original) The voltage regulator of claim 42, wherein the programming code comprising instructions for functioning as a master regulator comprises:
programming code comprising instructions for sensing an output of at least one alternator;
programming code comprising instructions for generating a control signal based on the sensed output;
programming code comprising instructions for generating a regulating signal for an alternator associated with the master regulator based on the control signal;
programming code comprising instructions for generating a message to be sent to a follower regulator based on the control signal; and
programming code comprising instructions for sending the message through the communication interface.

44. (Original) The voltage regulator of claim 43, wherein the programming code comprising instructions for functioning as a follower regulator comprises:
programming code comprising instructions for receiving the message through the communication interface; and
programming code comprising instructions for generating a regulating signal for an alternator associated with the regulator based on the message received.

45. (Original) In a system wherein at least source of electric power are connected in parallel, each source of electric power having associated with it a regulator, each regulator for producing a regulating signal for its associated source of electric power, wherein the improvement comprises:

code in the memory of the regulator for functioning as a master regulator;
code in the memory of the regulator for functioning as a follower regulator; and
means for determining whether the regulator is the master regulator or follower regulator, wherein a regulator may function as a master regulator or a follower regulator.

46. (Original) The improvement as claimed in claim 45, wherein the code for functioning as a master regulator comprises code for generating at least one signal to send to a follower regulator and sending the signal to the follower regulator.

47. (Original) The improvement as claimed in claim 46, wherein the sources of electric power comprise alternators producing power from at least one source of motive power; and

wherein the code for functioning as a follower regulator comprises code for receiving the signal from the master regulator and generating a regulating signal based on the signal from the master regulator for controlling an alternator associated with the follower regulator.

48. (Original) The improvement as claimed in claim 45, wherein the means for determining comprises code for arbitrating among regulators to determine which regulator is the master regulator.

49. (Currently Amended) In a system wherein at least two sources of electric power are connected in parallel, each source of electric power having associated with it a regulator, each regulator for producing a regulating signal for its associated source of electric power, one of the regulators being a master regulator and at least one of the regulators being a follower regulator, a method for controlling the sources of electric power comprising

sensing, by the follower regulator, at least one operational characteristic for its associated source of electric power ~~an output of at least one of the sources of electric power;~~

receiving, by the follower regulator, a control signal sent from the master regulator; and

~~generating a control signal with the master regulator based on the sensed output;~~

~~generating a regulating signal with the master regulator for the source of electric power associated with the master regulator based on the control signal;~~

~~sending a message from the master regulator to the follower regulator based on the control signal; and~~

~~determining with the follower regulator, whether to control a source of electric power associated with the follower regulator accept or reject the control signal based on the message sent from the master regulator operational characteristic for the follower's associated source of electric power.~~

50. (Currently Amended) The method for controlling alternators in claim 49, wherein the sources of electric power comprise alternators producing power from at least one source of motive power; ~~and~~

~~wherein determining whether to control a source of electric power associated with the follower regulator based on the message sent from the master regulator comprises sensing an output with the follower regulator of the alternator associated with the follower regulator.~~

51. (Currently Amended) The method for controlling alternators in claim 50, wherein determining whether to accept or reject the control signal ~~control an alternator associated with the follower regulator based on the message sent from the master regulator~~ further comprises:

generating a follower control signal with the follower regulator based on the output sensed by the follower regulator; and

comparing the follower control signal with the message sent from the master regulator.

52. (Currently Amended) The method for controlling alternators in claim 49, wherein determining whether to accept or reject the control signal ~~control an alternator associated with the follower regulator based on the message sent from the master regulator~~ comprises rejecting ignoring the message from the master regulator; and

~~further comprising~~ comprises:

~~sensing an output with the follower regulator of the source of electric power associated with the follower regulator;~~

~~generating a follower control signal with the follower regulator based on the output sensed by the follower regulator; and~~

generating a regulating signal with the follower regulator for its associated ~~[[the]]~~ source of electric power ~~associated with the follower regulator~~ based on at least the follower control signal operational characteristic for the follower's associated source of electric power.

53. (New) The system in claim 49, further comprising:
rejecting, by the follower regulator, the control signal; and
notifying the master regulator that the follower has rejected the control signal.

54. (New) The system in claim 17, wherein the follower regulator independently verifies whether to use the control signal.

55. (New) The system in claim 17, wherein determining whether to use the follower regulator signal comprises the follower regulator determining, based on the operating characteristic, whether the follower regulator signal is outside predetermined guidelines.

56. (New) In a system wherein at least two sources of electric power are connected in parallel, each source of electric power having associated with it a regulator, each regulator for producing a regulating signal for its associated source of electric power, a method for controlling the sources of electric power comprising:

sending a first communication from the first regulator to the second regulator; and
sending a second communication from the second regulator to the first regulator.

57. (New) The method of claim 56, wherein the sources of electric power comprise alternators producing power from at least one source of motive power; and
further comprising sensing with at least one regulator an output of its associated alternator.

58. (New) The method of claim 56, further comprising:
determining at least one operational characteristic of at least one source of power; and
determining a control signal based on the operational characteristic, the control signal for controlling at least one of the sources of power.

59. (New) The method of claim 58, wherein the operational characteristic comprises voltage.

60. (New) The method of claim 58, wherein the operational characteristic comprises efficiency.

61. (New) The method of claim 60, wherein determining at least one operational characteristic comprises determining efficiency of each source of power; and
wherein determining a control signal comprises the control signal based on the efficiency of each source of power.

62. (New) The method of claim 58, wherein the operational characteristic comprises operational life.

63. (New) The method of claim 62, wherein determining at least one operational characteristic comprises determining operational life of each source of power; and
wherein determining a control signal comprises the control signal based on the operational life of each source of power.

64. (New) The method of claim 58, wherein the operational characteristic comprises percentage of maximum output of at least one of the sources of power.

65. (New) The method of claim 64, wherein determining at least one operational characteristic comprises determining the percentage of maximum output of each source of power; and
wherein determining a control signal comprises the control signal based on the percentage of maximum output of each source of power.

66. (New) The method of claim 58, wherein the operational characteristic comprises temperature.

67. (New) The method of claim 56, wherein the first regulator is adapted to function as a master regulator and a follower regulator; and

wherein the second regulator is adapted to function as a master regulator and a follower regulator.

68. (New) A voltage regulator comprising:
means for receiving a control signal;
means for independently verifying whether to control a source of electric power associated with the voltage regulator using the control signal; and
means for rejecting the control signal, based on the means for independently verifying, and for using a different signal to control the source of electric power.

69. (New) The voltage regulator in claim 68, wherein the means for independently verifying comprises means for determining, based on at least one operational characteristic of the source of electric power, whether the control signal is outside predetermined guidelines.

70. (New) The voltage regulator in claim 69, wherein the operational characteristics are selected from the group consisting of voltage, output rating, temperature, efficiency, speed, and accumulated operational life.

71. (New) A system for producing electrical power comprising:
at least two sources of electric power connected in parallel, the sources of electric power individually responsive to an associated regulating signal;
at least two voltage regulators comprising:
a master voltage regulator for producing a regulating signal to the associated source of electric power, and for sending a follower regulator signal indicative of a percentage of maximum power; and
at least one follower regulator for receiving the follower regulator signal, for sensing at least one operational characteristic of a source of electric power associated with the follower regulator, and for generating a regulating signal for its associated source of electric power based on at least one operating characteristic in order for the source of electric power to operate at the percentage of maximum power.

72. (New) The system in claim 71, wherein the follower regulator senses speed and temperature of its associated source of electric power to generate the regulating signal.

73. (New) A voltage regulator having functionality as a master regulator and as a follower regulator comprising:

- a processor;
- a communication interface in communication with the processor;
- memory in communication with the processor; and
- programming code stored in the memory for operating as one of a master regulator or follower regulator and for reconfiguring the voltage regulator to operate as another of the master regulator or follower regulator.

74. (New) The voltage regulator of claim 73, wherein the programming code reconfigures the voltage regulator after a predetermined period.

75. (New) The voltage regulator of claim 73, wherein the programming code reconfigures the voltage regulator after a predetermined condition is met.

76. (New) The voltage regulator of claim 75, wherein the condition comprises:
receiving a control signal from another regulator; and
determining that the control signal should not be used to control a source of power associated with the voltage regulator.

77. (New) In a system wherein at least first source of electric power and a second source of electric power are connected in parallel, the first source of power having associated with it a first regulator, the second source of power having associated with it a second regulator, each regulator for producing a regulating signal for its associated source of electric power, a method for controlling the sources of electric power comprising
operating the first regulator as a master regulator;
operating the second regulator as a follower regulator; and
reconfiguring the first regulator and the second regulator so that the first regulator operates as a follower regulator and the second regulator operates as a master regulator.

78. (New) The method of claim 77, wherein reconfiguring the first regulator and the second regulator is performed after a predetermined period of operation.

79. (New) The method of claim 77, wherein operating the second regulator as a follower regulator comprises receiving, by the second regulator, a control signal from first regulator;

further comprising determining, by the second regulator, that the control signal should not be used to control a source of power associated with the second regulator; and

wherein reconfiguring the first regulator and the second regulator is performed if it is determined that the control signal should not be used to control a source of power associated with the second regulator.

80. (New) The method of claim 77, further comprising, after reconfiguring the first regulator and the second regulator, reconfiguring the first regulator and the second regulator again so that the first regulator operates as a master regulator and the second regulator operates as a follower regulator.

81. (New) The method of claim 80, wherein the first and second regulator alternate between operating as a master regulator and a follower regulator.

82. (New) The method of claim 81, wherein the alternating is based on a predetermined duty cycle.